tralian stations, to ascertain the weather conditions at any place in the waters surrounding the Pacific Islands, New Zealand, and Auatralia.

Primarily this service is given for the benefit of the vessels in these waters, but it is hoped that from the information reported daily to the meteorological stations in New Zealand valuable information and data may be compiled to assist in forecasting weather conditions throughout the South Pacific waters.—*Vice Consul John E. Moran, Wellington, New Zealand.*

SUBMARINE VOLCANO IN THE TONGA GROUP.

ANDREW THOMSON, Acting Director.

[Apia Observatory, Apia, Samoa, July 20, 1923.]

A submarine volcano was sighted on July 1 (eastern time) by Captain Davey, of the Union S. S. passenger liner *Tofua*, about 25 miles east of Tonga Tabu, the main island of the Tonga group.

The geographical position of the volcano was very closely 175° 33′ W., 20° 52′ S. When first sighted, the vapor from the volcano was taken to be the smoke of a passing steamer, but on nearer approach the density and great volume of steam made the true cause evident. The steam column rose to a height of 80 or 90 feet and trailed out like a banner over the ocean for a mile before becoming dissipated. At the level of the ocean the steam column was of the order of 100 feet in diameter. During the time the steam column was visible it remained fixed in size and position. There was marked turbulence and discoloration of the water at the point where the steam issued from the water. It was variously estimated that the water was shot up to a height from 2 to 4 feet above the sea.

The steam column was at the north end of a circular, pale-green area, about one-half mile in diameter. This area was sharply distinguished from the deep blue of the surrounding ocean. The charts give a depth of 550 fathoms for this locality. The volcano is well south of the position indicated on the charts for a volcano active in 1911, and is on the run of steamers from Suva to Nukualofa, the chief port of the Tonga group. There was no indication of volcanic activity when Captain Davey sailed over this position in 1920.

GROUND SURFACE TEMPERATURES AS DEPENDENT ON INSOLATION AND AS CONTROLLING DIURNAL TEMPERATURE UNREST AND GUSTINESS.[1]

By M. ROBITZCH.

[Abstracted from Beitrage zur Physik der freien Atmosphäre, 1921, 9: 1-11.]

From March to June, 1916, continuous observations of the difference in temperature between the surface and a depth of 1.25 m. were made with thermo-elements and a recording galvanometer, in sandy soil without vegetation. Simultaneous records of insolation were also obtained. The closeness of the relation between ground surface temperature and the insolation on a horizontal surface on a day with cumulus clouds is evident from Figure 1. For the general discussion the author chose six bright days in May and June and averaged the values. Figure 2 shows the intensity of insolation normal to the sun's rays and on a horizontal surface. The occurrence at 10 a. m. of the maximum intensity at normal incidence is readily explained as a result of the effect of cumulus clouds in cutting off sunlight intermittently during the following six hours. The diurnal course of insolation on

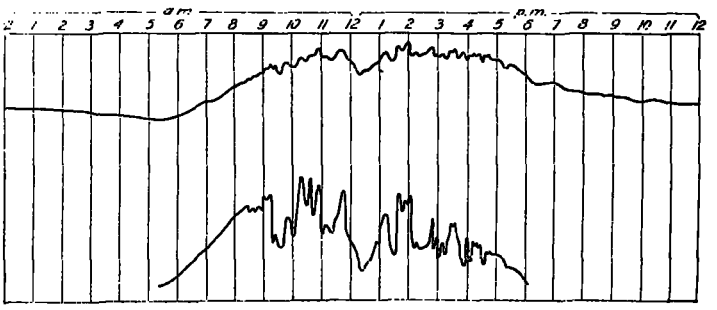

FIG. 1.—Relation between ground surface temperature (upper curve) and insolation on a horizontal surface (lower curve) on a day with cumulus clouds.

the horizontal surface of the ground, and the resulting surface temperature are shown in Figure 3, in which the ordinates have been so adjusted as to make the two curves

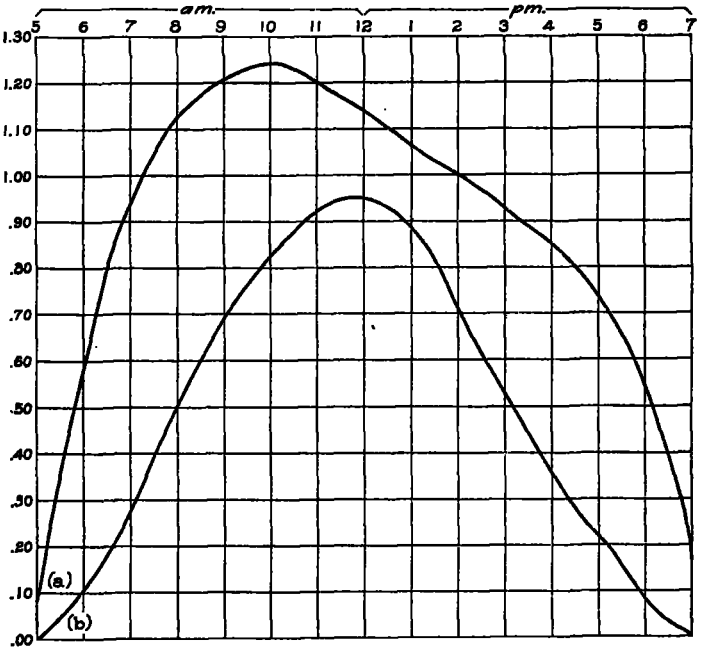

FIG. 2.—Intensity of insolation on a surface normal to the sun's rays (curve *a*) and on a horizontal surface (curve *b*).

cross at the minimum and maximum temperature, where insolation and outgoing radiation are equal. Thus the area ABCD equals CEAF, the former representing the

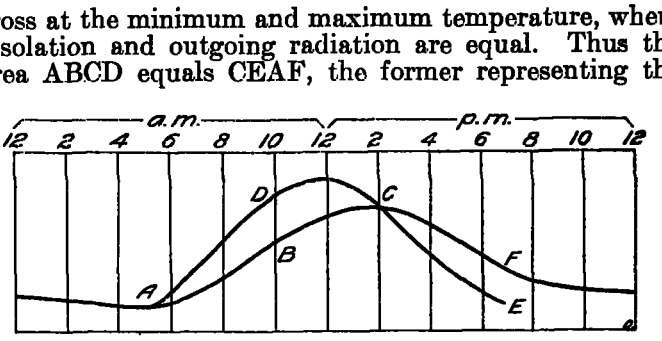

FIG. 3.—Diurnal course of insolation on a horizontal surface (curve *ADCE*) and resulting surface temperature (curve *ABCF*).

heat used in evaporating moisture from the ground and in warming the air, and the latter, the heat received by condensation and by return of heat from the air.

[1] Einige Bezeihungen zwischen der Temperature der Erdoberflache, der Insolation und anderen meteorologischen Faktoren.